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NOTICES FROM THE LICK OBSERVATORY.*

PREPARED BY MEMBERS OF THE STAFF.

OBSERVATIONS OF THE SATELLITES OF *SATURN*.

This series of observations — viz., those given in the *Bulletin* of the Lick Observatory, No. 17 — includes my measurements of the relative positions of all the satellites of *Saturn* except *Iapetus*, the one most distant from the planet; also, measurements of the directions and distances of *Enceladus*, *Tethys*, *Dione*, *Rhea*, *Titan*, and *Hyperion* from the center of the planet. The latter measurements were difficult to make, owing to *Saturn's* large size and the unsymmetrical form of the visible portion of the planet's disc. During the years in which these observations were made the rings had about their maximum opening, and a considerable portion of the planet's southern hemisphere was concealed beneath them. In 1898 and in 1901 its south polar region was invisible. This made it impossible to obtain complete sets of measures of the rectangular coordinates of the satellites from the preceding and following limbs and from the poles of the planet, and such measures were therefore not attempted. The position-angles and distances were obtained by bisecting the disc of the planet with the micrometer-wire. My judgment as to the position of the center of the disc was formed partly by considering the shape and size of the visible portion of the disc and what would have to be added to it to render its outline truly elliptical, and partly from the configuration formed by the inner edge of the ring and the outline of the planet.

Measurements of the relative positions of two satellites can be made with comparative ease, and the results so obtained are less subject to large systematic and accidental errors than those just described. It appears quite certain that improvement in the theories of the motions of the satellites of *Saturn* will be made largely by means of the observations of the relative positions of the satellites themselves. On this account, in the present

* Lick Astronomical Department of the University of California.

series, it has been the first object to secure as many measures of this kind as possible. During the past year the only satellites connected directly with the planet were the remote ones, *Titan* and *Hyperion*.
W. J. HUSSEY.

RESIDUALS FOR OBSERVATIONS OF THE SATELLITES OF
URANUS AND *NEPTUNE*.

I have compared my observations of the satellites of *Uranus*, made in 1897 and 1898, with places computed by means of Professor NEWCOMB'S tables of their motions, given in Appendix I of the Washington Observations for 1873. The average values of the residuals, in the sense O-C, are as follows:—

<i>Ariel</i> . . .	+ 1°.5	— 0".19
<i>Umbriel</i> . .	+ 2 .0	+ 0 .12
<i>Titania</i> . . .	+ 1 .3	— 0 .05
<i>Oberon</i> . . .	+ 0 .6	— 0 .17

These residuals, like those recently published by Professor AITKEN, show that the satellites are slightly in advance of their predicted places. The differences, however, between the observed and computed position-angles are very small, and would vanish if the adopted mean motions were very slightly increased.

I have also compared my observations of the satellite of *Neptune* with places computed by means of Dr. HERMANN STRUVE'S elements. The average values are as follows:—

Satellite of <i>Neptune</i> . .	+ 0°.2	+ 0".33
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These elements represent the observation on angle with great exactness, all the residuals being of the same order of magnitude as the probable errors of observation.
W. J. HUSSEY.

THE PRESSURE OF HEAT AND LIGHT RADIATION.

At the meeting of the American Association for the Advancement of Science, held in Denver in August, 1901, a paper* by Professor E. F. NICHOLS and Mr. G. F. HULL, of Dartmouth College, was read, giving an account of their experiments in determining the pressure of heat and light. A paper on the same subject was read by Professor NICHOLS at the meeting of the Astronomical and Astrophysical Society of America at Washington, in December, 1901.

* Published in the *Physical Review*, Vol. XIII, No. 5, November, 1901.